Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

Claims 1-19. (Cancelled)

20. (New) A system for alleviating phantom limb pain and selectively delivering stimulation signals to a patient having a limb stump, comprising:

a prosthetic limb that is attachable to the patient's limb stump, the prosthetic limb including a plurality of sensors that produce sensory signals;

a signal generator for producing electrical stimulation signals to stimulate one or more selected sensory nerve fibers of a severed limb nerve, the electrical stimulation signals approximating a pattern of sensations that would be received from a normal, innervated limb before it was amputated;

a microprocessor that receives the sensory signals and is programmed to cause the signal generator to produce the electrical stimulation signals and to deliver the electrical stimulation signals to the one or more selected sensory nerve fibers in order to provide sensations to the patient that appear to arrive from the prosthetic limb, wherein the selection of the one or more sensory nerve fibers is based on feedback from the patient regarding which sensory nerve fibers correspond to which of the plurality of sensors;

means for transmitting the sensory signals from the plurality of sensors to the microprocessor; and

means for transmitting the electrical stimulation signals to the selected sensory nerve fibers;

wherein the means for transmitting the electrical stimulation signals to the selected sensory nerve fibers includes a plurality of electrodes adapted for implantation in close proximity to the severed limb nerve and wherein each electrode is in close proximity to different sensory nerve fibers of the severed limb nerve.

21. (New) The system of Claim 20, wherein the selection of the electrical stimulation signals is based on feedback from the patient.

22. (New) The system of Claim 20, wherein the microprocessor is programmed to cause the signal generator to produce electrical stimulation signals in the absence of sensory signals produced by the plurality of sensors to alleviate phantom limb pain.

23. (New) The system of Claim 20, wherein the signal generator and microprocessor are adapted for location outside the body.

24. (New) The system of Claim 20, wherein the signal generator and microprocessor are adapted for location inside the prosthetic limb.

25.(New) The system of Claim 20, wherein the signal generator and microprocessor are adapted for location inside the body.

26. (New) The system of Claim 20, wherein the signal generator and microprocessor are adapted for location inside the limb stump.

27. (New) The system of Claim 20, wherein the plurality of sensors sense any of touch, pressure, force, slip, joint position or temperature.

28. (New) The system of Claim 20, wherein the means for transmitting the electrical stimulation signals is telemetric.

29. (New) The system of Claim 28, wherein the telemetric transmission means includes a transmitting antenna coupled to the signal generator and a receiving antenna coupled to the electrodes.

30. (New) The system of Claim 20, wherein the means for transmitting the electrical stimulation signals includes a receiver adapted to be implanted in the body and coupled to the plurality of electrodes, wherein electrical stimulation signals are supplied to one or more of the electrodes to alleviate phantom limb pain when the prosthetic limb is not in use.

31. (New) The system of Claim 20, wherein the means for transmitting the electrical stimulation signals includes cables extending between the one or more electrodes and the signal generator.

32. (New) The system of Claim 20, wherein the electrical stimulation signals are impulses that have a duration in the range of about 10 to 1000μs.

33. (New) The system of Claim 20, wherein the electrical stimulation signals are monophasic.

34. (New) The system of Claim 20, wherein the electrical stimulation signals are biphasic.

35. (New) The system of Claim 20, wherein the electrical stimulation signals have a current amplitude selected to be 1-10 times a current threshold required to recruit a large diameter sensory nerve fiber without recruiting a pain nerve fiber.

36. (New) The system of Claim 20, wherein the signal generator can adjust the amplitude of the electrical stimulation signals.

37. (New) The system of Claim 20, wherein the signal generator can adjust the frequency of the electrical stimulation signals.

38. (New) The system of Claim 20, wherein the electrodes are incorporated within an insulating nerve cuff that when implanted, circumferentially surrounds the severed limb nerve, wherein each electrode in the nerve cuff is in close proximity to different sensory nerve fibers of the severed limb nerve.

39. (New) The system of Claim 38, wherein the nerve cuff is a multi-chambered, tubular nerve cuff including a number of parallel ridges that provide insulation between electrodes.

40. (New) The system of Claim 20, further comprising a nerve cuff that when implanted surrounds the severed limb nerve, the nerve cuff having a number of isolated chambers and a catheter associated with each chamber for selectively delivering pharmacological agents to sensory nerve fibers of the severed limb nerve and wherein the means for delivering the electrical stimulation signals to the selected nerve fibers causes a pharmacological agent to be delivered in one or more of the catheters.

41. (New) The system of Claim 20, wherein the means for transmitting the electrical stimulation signals to the sensory nerve fibers in the limb stump include an optical transmission link.

42. (New) A system for alleviating phantom limb pain of a patient having a limb stump, comprising:

a signal generator for producing electrical stimulation signals to stimulate one or more selected sensory nerve fibers of a severed limb nerve, the electrical stimulation signals approximating a pattern of sensations that would be received from a normal, innervated limb before it was amputated;

a microprocessor that is programmed to cause the signal generator to produce the electrical stimulation signals and to deliver the electrical stimulation signals to one or more selected sensory nerve fibers in order to alleviate phantom limb pain, wherein the selection of the electrical stimulation signals is based on feedback from the patient; and

means for transmitting the electrical stimulation signals to the selected sensory nerve fibers;

wherein the means for transmitting the electrical stimulation signals to the selected sensory nerve fibers includes a plurality of electrodes adapted for implantation in close proximity to the severed limb nerve and wherein each electrode is in close proximity to different sensory nerve fibers of the severed limb nerve.

43. (New) The system of Claim 42, wherein the selection of the electrical stimulation signals is based on feedback from the patient.

44. (New) The system of Claim 42, wherein the signal generator and microprocessor are adapted for location outside the body.

45.(New) The system of Claim 42, wherein the signal generator and microprocessor are adapted for location inside the body.

46. (New) The system of Claim 42, wherein the signal generator and microprocessor are adapted for location inside the limb stump.

47. (New) The system of Claim 42, wherein the means for transmitting the electrical stimulation signals is telemetric.

48. (New) The system of Claim 47, wherein the telemetric transmission means includes a transmitting antenna coupled to the signal generator and a receiving antenna coupled to the electrodes.

49. (New) The system of Claim 42, wherein the means for transmitting the electrical stimulation signals includes cables extending between the one or more electrodes and the signal generator.

50. (New) The system of Claim 42, wherein the electrical stimulation signals are impulses that have a duration in the range of about 10 to 1000μs.

51. (New) The system of Claim 42, wherein the electrical stimulation signals are monophasic.

52. (New) The system of Claim 42, wherein the electrical stimulation signals are biphasic.

53. (New) The system of Claim 42, wherein the electrical stimulation signals have a current amplitude selected to be 1-10 times a current threshold required to recruit a large diameter sensory nerve fiber without recruiting a pain nerve fiber.

54. (New) The system of Claim 42, wherein the signal generator can adjust the amplitude of the electrical stimulation signals.

55. (New) The system of Claim 42, wherein the signal generator can adjust the frequency of the electrical stimulation signals.

56. (New) The system of Claim 42, wherein the electrodes are incorporated within an insulating nerve cuff that when implanted, circumferentially surrounds the severed limb nerve, wherein each electrode in the nerve cuff is in close proximity to different sensory nerve fibers of the severed limb nerve.

57. (New) The system of Claim 56, wherein the nerve cuff is a multi-chambered, tubular nerve cuff including a number of parallel ridges that provide insulation between electrodes.

58. (New) The system of Claim 42, further comprising a nerve cuff that when implanted surrounds the severed limb nerve, the nerve cuff having a number of isolated chambers and a catheter associated with each chamber for selectively delivering pharmacological agents to sensory nerve fibers of the severed limb nerve and wherein the means for delivering the electrical stimulation signals to the selected nerve fibers causes a pharmacological agent to be delivered in one or more of the catheters.

59. (New) The system of Claim 42, wherein the means for transmitting the electrical stimulation signals to the sensory nerve fibers in the limb stump include an optical transmission link.

60. (New) A method of alleviating phantom limb pain and selectively delivering stimulation signals to a patient having a limb stump, comprising the steps of:

providing the patient with a prosthetic limb that is attachable to the patient's limb stump, the prosthetic limb including a plurality of sensors that produce sensory signals;

processing the sensory signals produced by the plurality of sensors;

generating electrical stimulation signals approximating a pattern of sensations that would be received from a normal, innervated limb before it was amputated, in response to the processed sensory signals; and

delivering the electrical stimulation signals to the one or more selected sensory nerve fibers in order to provide sensations to the patient that appear to arrive from the prosthetic limb, wherein the selection of the one or more sensory nerve fibers is based on feedback from the patient regarding which sensory nerve fibers correspond to which of the plurality of sensors.

61. (New) The method of Claim 60, wherein the selection of the electrical stimulation signals is based on feedback from the patient.

62. (New) The method of Claim 60, comprising the additional step of generating electrical stimulation signals in the absence of sensory signals produced by the plurality of sensors to alleviate phantom limb pain.

63. (New) The method of Claim 60, wherein the plurality of sensors sense any of touch, pressure, force, slip, joint position or temperature.

64. (New) The method of Claim 60, wherein the electrical stimulation signals are impulses that have a duration in the range of about 10 to 1000μs.

65. (New) The method of Claim 60, wherein the electrical stimulation signals are monophasic.

66. (New) The method of Claim 60, wherein the electrical stimulation signals are biphasic.

67. (New) The method of Claim 60, wherein the electrical stimulation signals have a current amplitude selected to be 1-10 times a current threshold required to recruit a large diameter sensory nerve fiber without recruiting a pain nerve fiber.

68. (New) The method of Claim 60, further comprising the step of adjusting the amplitude of the electrical stimulation signals.

69. (New) The method of Claim 60, further comprising the step of adjusting the frequency of the electrical stimulation signals.

70. (New) A method of alleviating phantom limb pain and selectively delivering stimulation signals to a patient having a limb stump, comprising the steps of:

generating electrical stimulation signals approximating a pattern of sensations that would be received from a normal, innervated limb before it was amputated; and

delivering the electrical stimulation signals to one or more selected sensory nerve fibers in order to alleviate phantom limb pain, wherein the selection of the electrical stimulation signals is based on feedback from the patient.

71. (New) The method of Claim 70, wherein the selection of the electrical stimulation signals is based on feedback from the patient.

72. (New) The method of Claim 70, wherein the electrical stimulation signals are impulses that have a duration in the range of about 10 to 1000μs.

73. (New) The method of Claim 70, wherein the electrical stimulation signals are monophasic.

74. (New) The method of Claim 70, wherein the electrical stimulation signals are biphasic.

75. (New) The method of Claim 70, wherein the electrical stimulation signals have a current amplitude selected to be 1-10 times a current threshold required to recruit a large diameter sensory nerve fiber without recruiting a pain nerve fiber.

76. (New) The method of Claim 70, further comprising the step of adjusting the amplitude of the electrical stimulation signals.

77. (New) The method of Claim 70, further comprising the step of adjusting the frequency of the electrical stimulation signals.